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DOCUMENT-IDENTIFIER: US 6321258 B1
TITLE: Administration of networked peripherals using particular file system

Brief Summary Text (12):
Accordingly, a computer system in one embodiment of the present invention includes a resource and a workstation. The resource provides a message in response to an address. The workstation is coupled to the resource for data communication. The workstation includes a file system having a named file and an administrator program. The named file includes a data structure including the address and a conditional expression. The administrator is executable by the workstation and is developed independently of the filename and the data structure. The administrator sends the address to obtain the message, evaluates the conditional expression in response to the message, and reports status of the resource in response to the evaluation.

Brief Summary Text (14):
A prerecorded data storage medium in another embodiment of the present invention includes a data storage medium and machine readable indicia recorded on the medium. The indicia include a file system, a data structure, and a file. The file system includes a first filename and a second filename. The data structure, identified by the first filename, supplies an external parameter and an address to a provided machine executable program for obtaining a message from a resource at the address. The program is developed without foreknowledge of the external parameter. The file, identified by the second filename, supplies to the program a description of a status of the resource. The second filename is identified by the external parameter in response to the message. The program reports the status responsive to the description.

Brief Summary Text (16):
A prerecorded data storage medium in yet another embodiment of the present invention includes a data storage medium and machine readable indicia recorded on the medium. The indicia include a file system, a first data structure, a second data structure, and a file. The file system includes a first, a second, and a third filename. The first data structure, identified by the first filename, supplies a first external parameter to a provided machine executable program for determining the second filename. The program is developed without foreknowledge of the first external parameter. The second data structure, identified by the second filename, supplies a second external parameter and an address for obtaining a message from a resource at the address. The file, identified by the third filename, supplies to the program a description of a status of the resource. The third filename is identified by the second external parameter in response to the message. The program reports the status responsive to the description.

Detailed Description Text (5):
A client workstation is a computer system that permits a user to send and receive information over a network. For example, local client 112 includes a conventional workstation having a conventional operating system, browser, and word processor. The operating system, for example, is of the type known as Windows NT marketed by Microsoft. The browser, for example, is of the type known as Navigator marketed by Netscape. Local client 112 represents one of possibly many workstations, joined similarly to network 114 for cooperation according to the conventional peer-to-peer or conventional client-server computing models. In each of these models, local client 112 shares access to one or more resources represented by resource 116.

Detailed Description Text (6):
A resource is any computer peripheral device capable of communication via a network. Some peripheral devices are primarily input devices (e.g. a scanner, a camera, or a measurement

instrument), others are primarily output devices (e.g. a printer, a plotter, or an audio/visual component), while still others have input and output capability (e.g. a modem, a data storage disk system or tape system, or a robot). In all cases, the resource both sends and receives messages over a network. Resource 116, for example, is a printer of the type marketed by Hewlett-Packard as model HP LaserJet 5 Si which receives messages from network 114 that identify configuration settings and sends messages over network 114 that identify operating status.

Detailed Description Text (10):
Local server 118 and remote server 120 cooperate in any conventional manner accomplishing file transfer. Files to be transferred for storage on disk system 119 originate on disk system 121. For example, (a) local and remote servers 118 and 120 each include a file transfer program, (b) local and remote servers cooperate in a manner similar to the cooperation of local client 112 and local server 118 as described above, or (c) local and remote servers 118 and 120 each support connection to the Internet. In this latter example, file transfer is accomplished by the known protocol TCP/IP and messages transferred between local server 118 and remote server 120 are compliant with HTTP as described above.

Detailed Description Text (12):
Files used by the administrator are stored on disk system 119 in any manner facilitating grouping of files and association of particular files with a particular resource. In addition, the file system of the present invention serves to associate files that make up the administrator program itself with the files used by the administrator. For example, file system 200 of FIG. 2 includes PROGRAMS directory 202, ADMIN directory 204, ADMIN_LIB directory 210, printer directory 212, hplj5sl directory 218 and possibly other directories 234. These directories are related in a conventional hierarchical manner. The names of files, names of directories, and descriptions of the interrelation between files and directories are stored on disk system 119 as prerecorded machine readable indicia of a hierarchical file system. Many machine readable indicia recording formats and recording methods are known for accomplishing the tree-like hierarchy of file system 200 such as those provided by operating systems MSDOS or Windows NT, both marketed by Microsoft. Such indicia are recorded on a data storage medium, for example a conventional magnetic disk of disk system 119. In variations of the present invention, such data storage media includes, for example, magnetic disk, magnetic tape, optical disk, compact disk read only memory (CDROM), and various known semiconductor memory device circuits providing, for example, nonvolatile memory accessed as if it were a disk system.

Detailed Description Text (13):
In file system 200, the operating system locates executable programs with reference to a PROGRAMS directory 202, having subdirectories for particular programs such as ADMIN directory 204 and other directories at this level, not shown. ADMIN directory 204 includes executable ADMIN.EXE file 206 (hereinafter called administrator 206, whether stored or being executed) and any other files, indicated generally as files 208, related to program execution, such as dynamically linked library files (DLLs). Administrator 206 is programmed to search for files to be used in a subdirectory named ADMIN_LIB. ADMIN_LIB directory 210 is a member of the same directory where administrator executable files are located, simplifying access to this subdirectory from administrator 206.

Detailed Description Text (14):
In file system 200, files to be associated with a resource are stored in a directory named for the resource. For example, hplj5si directory 218 includes files for use by the administrator for a resource 116 being a Hewlett-Packard LaserJet 5 Si printer. Resource 116 identifies itself with a character string from which the string hplj5si is derived. As a second example, printer directory 212 includes files for use by the administrator for a generic resource. Information files needed during execution of administrator program file ADMIN.EXE 206 are stored in an administrator library subdirectory ADMIN_LIB 210. Files in the library are grouped by resource with all files for each resource in a directory bearing the resource device name. For example, files for a default generic printer device are stored in printer directory 212. Files for a particular laser printer known as the HP LaserJet 5 Si marketed by Hewlett-Packard Co. are stored in hplj5si directory 218. Similarly, files for other devices, not shown, are stored in additional subdirectories indicated as 234.

Detailed Description Text (25):
A method of the present invention includes the capability to present the status of a new or
upgraded resource on a local client workstation without requiring a new version of an
administrator program running on the local server. For example, method 500 of FIG. 5 operates
with system 100 of FIG. 1 wherein a browser program and a word processor program are executing
on local client 112, resource 116 is a Hewlett-Packard LaserJet 5 Si printer, an additional
second resource (not shown in FIG. 1), remote server 120 is available for dial-up file transfer
services, and local server 118 is initially executing a web server program with access to file
system 200 described in FIGS. 2, 3, and 4 on disk system 119.

Detailed Description Text (34):
At step 522, administrator 206 interprets data structures 414 and 314 to identify all installed
capabilities having status to be reported. First, internal parameter DeviceClass is found at
record 422 with a value indicating status that can be reported. A value of zero corresponds to
legacy equipment and other equipment having no status that can be reported. Other values permit
upward compatible future expansion of functions of administrator 206.

Detailed Description Text (43):
File system 200 is somewhat independent of the content of resource information files. In other
words, ".gif" files may be added to file system 200 at any position and at any time without
affecting operation of administrator 206. For example, a data structure for the intray1 feature
as in intray1.glf file 226 appears in file system 200 but does not affect operation of
administrator 206. Likewise, a corresponding graphic file for the outtray1 feature does not
appear in file system 200. Without reference to such files from records of data structures 314
and 414, such inconsistencies in file system 200 cause no abnormal operation. The absence of
such references provides an example of the update operation of administrator 206.

Detailed Description Text (44):
At step 540, in response to viewing Discovery page 600, the user of local client 112 requests
an update of file system 200 by following the link associated with icon 616 identified by
subheading 609 and legend 617. Administrator 206 includes internal definitions for subheading
609, icon 616, legend 617, and the link. The user need not initiate an update when, as in one
variation, file system 200 includes support for all existing configurations of all expected
resources. In such a case when a resource is modified to add additional installed features or
additional resources are added to network 114, accurate and complete status for existing,
modified, and added resources is provided automatically by operation of administrator 206 as is
apparent from the above description. For this example, however, an update is requested either
(a) by the user, possibly at the advice of a resource manufacturer, or (b) in an alternate
variation, automatically on the lapse of a predefined time period, possibly set in conjunction
with a periodic maintenance schedule.

Detailed Description Text (45):
At step 542, administrator 206 establishes communication channel 130 to remote server 120
having disk system 121. Local server 118 and remote server 120 cooperate using file system
maintenance techniques to determine (a) whether files on disk system 119 are stale, i.e. out of
date and in need of replacement or deletion, (b) what files are to be transferred by file
transfer protocol to disk system 119, and (c) in what sequence the files are to be transferred
so as to avoid abnormal operation of administrator 206 in the event that communication channel
130 fails during the sequence of file transfers. File system maintenance techniques include
comparison of information kept with each file such as date created, date last modified, date
last accessed, and file size (indicating file integrity). In addition each data structure, in
the illustrated embodiment, includes internal parameter UpdateAfter as in record 324 and 424.
The date value of the UpdateAfter parameter is used by administrator 206 to speed the update
procedure, restricting file transfers to only those files whose UpdateAfter date value precedes
the current date. In such an embodiment, the predefined time period described in the previous
paragraph is set to a shorter period such as 30 days as opposed to an annual period used in one
variation without the UpdateAfter function. In addition, disk system 121 includes a
hierarchical list of dependencies among resource information files used to establish a proper
sequence beginning with level zero files (resource information files making no reference to

other resource information files), level one files (resource information files making reference
to files having a level no greater than level zero), level two files (resource information
files making reference to files having a level no greater than level one), and so on. Files are
then transferred in the conventional manner.

Detailed Description Text (48):
The foregoing description discusses preferred embodiments of the present invention, which may
be changed or modified without departing from the scope of the present invention. For example,
in alternate variations, additional logical operators including logical-not, exclusive-or,
numerical greater-than, character-canonical-order, and the like are available for use in
conditional expressions. Further, in an alternate variation, file system 200 is organized with
two parallel branch directory structures under ADMIN_LIB 210. The first branch includes device
(or resource) directories for resource information files only. The second branch includes
device directories for ".gif" files only. Separation of files of different types aids file
maintenance operations.

Detailed Description Text (49):
In yet another alternate variation, inheritance is dictated in addition or alternately by the
position of a resource information file in the hierarchical tree structure of file system 200.
In one such variation, a grandparent directory contains printer.glf file 212, a parent
directory contains hplj5si.glf file 220 and a child directory for a new model contains file
hplj6x.glf. By its position in the tree structure, data structures from files 220 and 212 are
inherited by the data structure in file hplj6x.glf, without the "INHERIT" directive such as in
record 436.

Detailed Description Text (50):
Without significant modification administrator 206 and file system 200 are used in alternate
system configurations. In a first alternate system variation, local server 118 supports
communication to additional remote clients. A remote client is similar in structure and
operation to local client 112, except that a remote client communicates in a conventional
manner with local server 118 without connection to network 114. In another alternate system
variation, the functions of local client 112 and local server 118 are combined into one
workstation, network 114 being omitted and resource 116 being conventionally coupled to the
workstation. Such a variation corresponds to the home office (personal computer) configuration.

CLAIMS:

1. A method performed by a server for resource administration, the server coupled to the
resource by a network, the server comprising a file system comprising a first file, the first
file comprising instructions for performing the method, the method comprising:

accessing the network to receive identification of the resource;

accessing a second file in accordance with the identification;

interpreting a record read from the second file, the record comprising indicia of an external
parameter, indicia of an address, indica of an expected value, and indicia of a constant,
indicia of the external parameter being absent from the instructions of the first file;

sending the address via the network to obtain a message, the resource providing the message in
response to the address;

if the message corresponds to the indicia of the expected value, identifying a memory in
accordance with the indicia of the external parameter and storing a value in the memory in
accordance with the indicia of the constant; and

reporting status of the resource in accordance with the value.

3. The method of claim 1 wherein the file system further comprises a directory name and the

step of accessing the second file further comprises identifying the directory name in accordance with the identification.

4. A method performed by a server for resource administration, the server coupled to the resource by a network, the server comprising a file system comprising a first file, the first file comprising instructions for performing the method, the method comprising:

accessing the network to receive identification of the resource; and

accessing a second file in accordance with the identification;

interpreting a first record read from the second file, the first record comprising indicia of a reference;

accessing a third file in accordance with the reference;

interpreting a second record read from the third file, the second record comprising indicia of an external parameter, indicia of an address, indicia of an expected value, and indicia of a constant, the indicia of the external parameter being absent from the instructions of the first file;

sending the address via the network to obtain a message, the resource providing the message in response to the address;

if the message corresponds to the indicia of the expected value, identifying a memory in accordance with the indicia of the external parameter and storing a value in the memory in accordance with the indicia of the constant; and

reporting status of the resource in accordance with the value.

6. A data storage medium comprising machine readable indicia recorded on the medium, the indicia comprising:

a. a file system comprising a first filename and a second filename;

b. a first file, identified by the first filename, the first file comprising a description of a status of a resource; and

c. a second file, identified by the second filename, the second file comprising indicia of an external parameter, indicia of an address, indicia of an expected value, and indicia of a constant, the address for obtaining a message from the resource, and the constant for determining the first filename for reporting the description of the status of the resource in accordance with the indicia of the external parameter when the message corresponds to the indicia of the expected value.

15. A data storage medium for use in a computer system to assist a user to accomplish at least one of installing, reconfiguring, upgrading, managing, and monitoring operation of a resource of the computer system, the medium comprising machine readable indicia recorded on the medium, the indicia comprising:

a. a file system comprising a first, a second, and a third filename;

b. a first data structure, identified by the first filename, that supplies a first external parameter to a provided resource administration program for determining the second filename, the program developed without foreknowledge of the first external parameter;

c. a second data structure, identified by the second filename, that supplies a second external parameter and an address for obtaining a message from the resource at the address; and

d. a file, identified by the third filename, that supplies to the program a description of a

status of the resource, the third filename identified by the second external parameter in response to the message, the program for reporting the status responsive to the description, wherein reporting facilitates at least one of installing, reconfiguring, upgrading, managing, and monitoring operation of the resource.

21. A method performed by a server for resource administration, the server comprising a <u>file system</u> comprising a first file, the first file comprising instructions for performing the method, the method comprising:

sending a first message to obtain an identification of a resource, the identification provided by the resource for facilitating access to a second file, sending accomplished via a network, the resource providing the first message in response to the address, wherein the server, the network, and the resource are part of a computer system;

accessing the second file in accordance with the identification of the resource to obtain a first conditional expression, the second file comprising a data structure, the data structure comprising the first conditional expression, an identification of a feature, a second conditional expression, and an address;

evaluating the first conditional expression to obtain the identification of the feature;

accessing the second file in accordance with the identification of the feature to obtain the second conditional expression;

sending the address to the resource to obtain a second message provided by the resource, the second message comprising a value of a parameter, the second message being provided in response to receiving an address that identifies the parameter;

evaluating the second conditional expression in accordance with the value of the parameter received with the second message; and

reporting status of the resource in accordance with evaluation of the second conditional expression.

22. A data storage medium comprising machine readable indicia recorded on the medium, the indicia comprising:

a. a <u>file system</u> comprising a first filename and a second filename;

b. a data structure, identified by the first filename, that supplies a first value and an address to a provided computer program, the program developed without foreknowledge of the first value and the address, the computer program for obtaining a second value from a provided resource, the second value being identified by the address; and

c. a file, identified by the second filename, that supplies to the program a description of a status of the resource, the second filename determined in accordance with the first value, the program for reporting the status in accordance with the description and the second value.

23. A data storage medium comprising machine readable indicia recorded on the medium, the indicia comprising:

a. a <u>file system</u> comprising a first, a second, and a third filename;

b. a first data structure, identified by the first filename, that supplies a first value to a provided computer program for determining the second filename, the program developed without foreknowledge of the first value;

c. a second data structure, identified by the second filename, that supplies to the program a second value and an address, the program for obtaining a third value from a provided resource, the third value being identified by the address; and

d. a file, identified by the third filename, that supplies to the program a description of a status of the resource, the third filename identified by the second value, the program for reporting the status in accordance with the description and the third value.

24. A method performed by a first server for resource administration, the first server coupled to the resource by a network, the first server comprising a file system comprising a first file, the first file comprising instructions for performing the method, the method comprising:

a. performing a step for accessing the network to receive identification of the resource;

b. performing a step for accessing a second file in accordance with the identification;

c. performing a step for interpreting a record read from the second file, the record comprising indicia of an external parameter, indicia of an address, indica of an expected value, and indicia of a constant, the indicia of the external parameter being absent from the instructions of the first file;

d. performing a step for sending the address via the network to obtain a message, the resource providing the message in response to the address;

e. if the message corresponds to the indicia of the expected value, performing a step for identifying a memory in accordance with the indicia of the external parameter and storing a value in the memory in accordance with the indicia of the constant; and

f. performing a step for reporting status of the resource in accordance with the value.

26. The method of claim 24 wherein:

the file system further comprise a directory name; and

the step for accessing the second file further comprises a step for identifying the directory name in accordance with the identification.

27. A method performed by a server for resource administration, the server coupled to the resource by a network, the server comprising a file system comprising a first file, the first file comprising instructions for performing the method, the method comprising:

performing a step for accessing the network to receive identification of the resource;

performing a step for accessing a second file in accordance with the identification;

performing a step for interpreting a first record read from the second file, the record comprising indicia of a reference;

performing a step for accessing a third file in accordance with the reference;

performing a step for interpreting a second record read from the third file, the record comprising indicia of an external parameter, indicia of an address, indica of an expected value, and indicia of a constant, the indicia of the external parameter being absent from the instructions of the first file;

performing a step for sending the address via the network to obtain a message, the resource providing the message in response to the address;

if the message corresponds to the indicia of the expected value, performing a step for identifying a memory in accordance with the indicia of the external parameter and storing a value in the memory in accordance with the indicia of the constant; and

performing a step for reporting status of the resource in accordance with the value.

44. A method performed by a server for resource administration, the server comprising a <u>file system</u> comprising a first file, the first file comprising instructions for performing the method, the method comprising:

performing a step for sending a first message to obtain an identification of a resource provided by the resource for facilitating access to a second file, the step for sending accomplished via a network, the resource providing the first message in response to the address, wherein the server, the network, and the resource are part of a computer system;

performing a step for accessing the second file in accordance with the identification of the resource to obtain a first conditional expression, the second file comprising a data structure, the data structure comprising the first conditional expression, an identification of a feature, a second conditional expression, and an address;

performing a step for evaluating the first conditional expression to obtain the identification of the feature;

performing a step for accessing the second file in accordance with the identification of the feature to obtain the second conditional expression;

performing a step for sending the address to the resource to obtain a second message provided by the resource, the second message comprising a value of a parameter, the second message being provided in response to receiving an address that identifies the parameter;

performing a step for evaluating the second conditional expression in accordance with the value of the parameter received with the second message; and

performing a step for reporting status of the resource in accordance with evaluation of the second conditional expression.

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Six Selection Factors and Pass Mark

These charts show how points are awarded in the six selection factors.

Factor One: Education	Maximum 25
You have a Master's Degree or Ph.D. **and** at least 17 years of full-time or full-time equivalent study.	25
You have two or more university degrees at the bachelor's level **and** at least 15 years of full-time or full-time equivalent study.	22
You have a three-year diploma, trade certificate or apprenticeship **and** at least 15 years of full-time or full-time equivalent study.	22
You have a university degree of two years or more at the bachelor's level **and** at least 14 years of full-time or full-time equivalent study.	20
You have a two-year diploma, trade certificate or apprenticeship **and** at least 14 years of full-time or full-time equivalent study.	20
You have a one-year university degree at the bachelor's level **and** at least 13 years of full-time or full-time equivalent study.	15
You have a one-year diploma, trade certificate or apprenticeship **and** at least 13 years of full-time or full-time equivalent study.	15
You have a one-year diploma, trade certificate or apprenticeship **and** at least 12 years of full-time or full-time equivalent study.	12
You completed high school.	5
Learn more about the specific requirements and definitions of terms.	
Factor Two: Official Languages	**Maximum 24**
1st Official Language	

High proficiency (per ability)	4
Moderate proficiency (per ability)	2
Basic proficiency (per ability)	1 to maximum of 2
No proficiency	0
Possible maximum (all 4 abilities)	16
2nd Official Language	
High proficiency (per ability)	2
Moderate proficiency (per ability)	2
Basic proficiency (per ability)	1 to maximum of 2
No proficiency	0
Possible maximum (all 4 abilities)	8
Learn more about the specific requirements and the documents you need.	
Factor Three: Experience	**Maximum 21**
1 year	15
2 years	17
3 years	19
4 years	21
Learn more about specific requirements for earning work experience points.	
Factor Four: Age	**Maximum 10**
21 to 49 years at time of application	10
Less 2 points for each year over 49 or under 21	
View the full age chart to determine your points.	
Factor Five: Arranged Employment In Canada	**Maximum 10**
You have a permanent job offer that has been confirmed by Human Resources and Skills Development Canada (HRSDC).	10
You are applying from within Canada and have a temporary work permit that was:	
issued after receipt of a confirmation of your job offer from HRSDC; or	10
you have a temporary work permit that was exempted from the requirement of a confirmed job offer from HRSDC on the basis of an international agreement (e.g., NAFTA), a significant benefit to Canada (e.g., intra-company transfer) or public policy on Canada's academic or economic competitiveness (e.g., post-graduate work).	10
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Factor Six: Adaptability	Maximum 10
Spouse's or common-law partner's education	3 - 5
Minimum one year full-time authorized work in Canada	5
Minimum two years full-time authorized post-secondary study in Canada	5
Have received points under the Arranged Employment in Canada factor	5
Family relationship in Canada	5
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Total	Maximum 100
Pass Mark	67

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1. If your score is **the same or higher** than the pass mark, then you may qualify to immigrate to Canada as a skilled worker. **After reading** the information on our Web site, if you wish to apply for immigration, consult our application instructions.

2. If your score is **less** than the pass mark, you are not likely to qualify to immigrate to Canada as a skilled worker. We recommend that you do not apply at this time.

   You may submit a formal application if you believe that there are factors that would show that you are able to become economically established in Canada. Send a detailed letter with your application explaining why you think you are able to become economically established in Canada. Include any documents that support your claim.

Principal Applicant
If you are married or living with a common-law partner, you and your spouse or common-law partner must decide who will be the principal applicant. The other person will be considered the dependant in the applications.

Note: A common-law partner is a person who has lived with you in a conjugal relationship for at least one year. Common-law partner refers to both opposite-sex and same-sex couples.

Use the self-assessment test to help you determine which person would earn the most points. The person who would earn the most points should apply as the principal applicant.

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would earn in the six selection factors explained above.

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